SS Step-Servo

New

3rd Generation Step-Servo

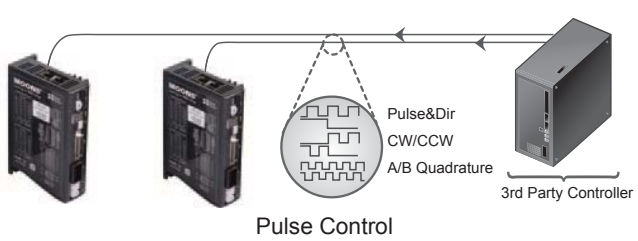
- Intelligent built-in controller
- Muti-axis field bus control
- Enhanced motor optimized design long life
- Efficient smooth accurate fast
- Low vibration low noise low heat

CE RoHS Compliant

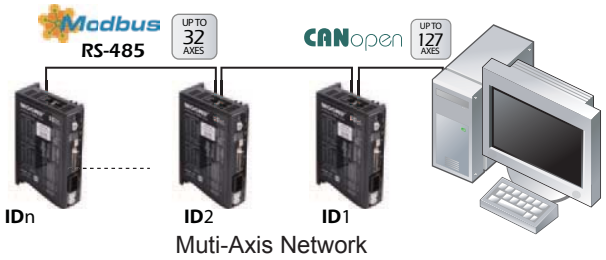
MOONS'
moving in better ways

The **Step-Servo** is an innovative revolution for the world of stepper motor, it enhances the stepper motors with servo technology to create a product with exceptional feature and broad capability.

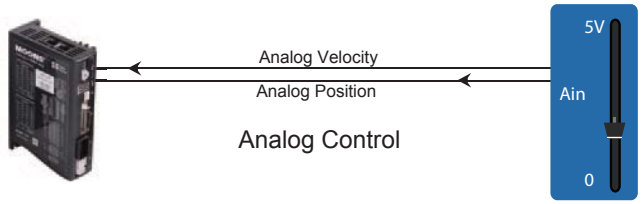
Multi-functional Capability



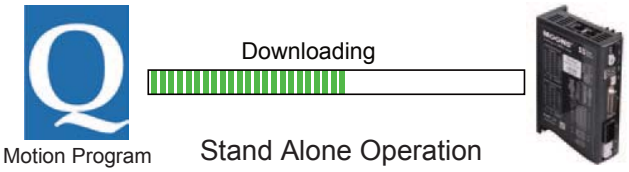
Pulse Control



Muti-Axis Network



Analog Control

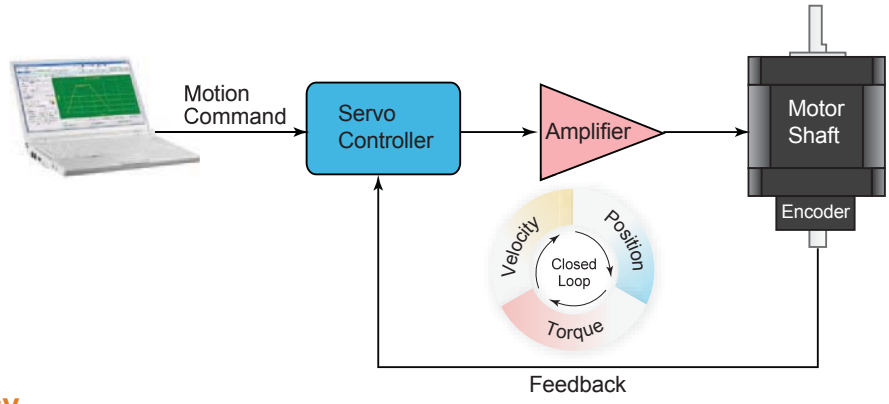


Motion Program

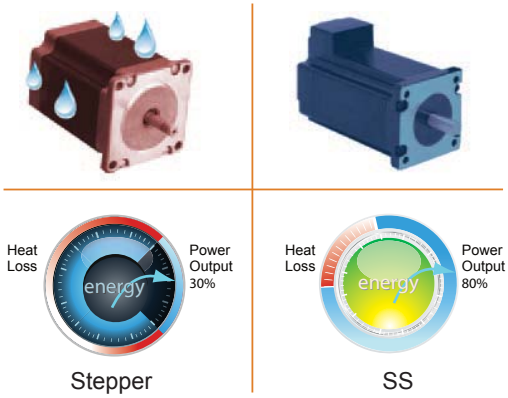
Stand Alone Operation

Closed Loop

- Very tight position and velocity control for the most demanding applications.
- Robust servo loops that tolerate wide fluctuation in load inertia and frictional loading.
- Precise positioning to within ±1 count using high resolution(20000 counts/ rev) encoder.



Low Heating/High Efficiency

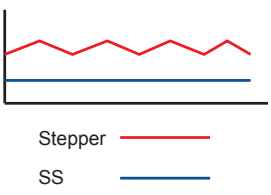


Stepper SS

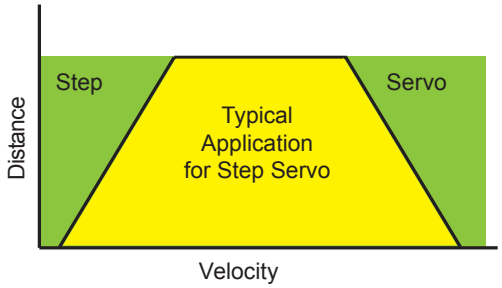
- Uses only the current required by the application, generating minimum heat output.
- When stand-still, current can reach nearly zero for extremely low heat output.
- Being able to use almost 100% of torque, allows for more efficient and compact motor usage.

Smooth & Accurate

- Space vector current control with 5000 line high resolution encoder, gives smooth and quiet operation, especially at low speeds.
  ------A feature never found with traditional stepping motors
- High stiffness due to the nature of the stepping motor combined with the highly responsive servo control
  ------Accurate position control both while running and static positioning



Fast Response



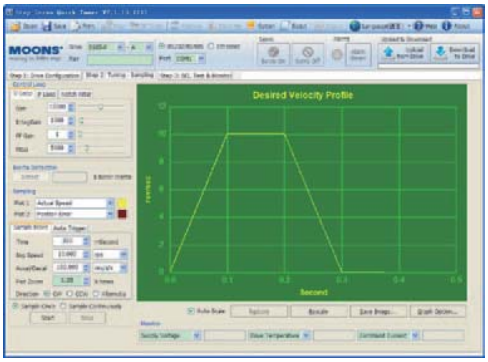
- When performing fast point-to-point moves, the high torque output and advanced servo control provides a very responsive system far exceeding what can be done with a conventional stepper system.

High Torque

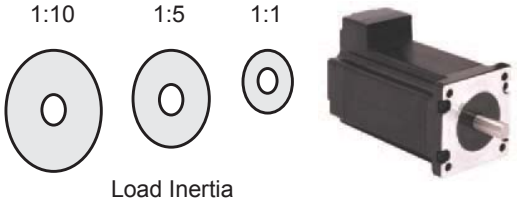
- Because the **Step-Servo** operates in full servo mode, all the available torque of the motor can be used.
- The motor can provide as much as 50% more torque in many applications. High torque capability often eliminates the need for gear reduction.
- Boost torque capability can provide as much as 50% more torque for short, quick moves.

Motion Monitoring

- For difficult control situations where performing a precise move is necessary, the **Step-Servo** Quick Tuner provide an easy to use interface for performing and monitoring the motion profile.
- Many common parameters such as Actual Speed or Position Error can be monitored to evaluate system performance.
- The monitoring is interactive with the servo tuning capability so that optimum performance can be achieved.



Easy Tuning

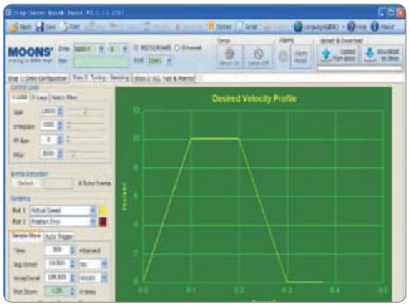


- Pre-defined tuning parameters for maximum control performance and stability.
- Easy selection list provides the level of control desired.
- In most cases NO extra manual tuning is required.

Key Features

- Up to 8 digital inputs, 4 digital outputs and 2 analog inputs for S/Q/C type
- A/B/Z differential encoder signal output supported for P/R type
- Automatic load inertia detection
- On board daisy chain connection for field bus control(RS-485, **Modbus/RTU**, **CANopen**)
- Multiple homing methods for S/Q type
- Software limit for S/Q type
- Built-in position table up to 63 points for S type

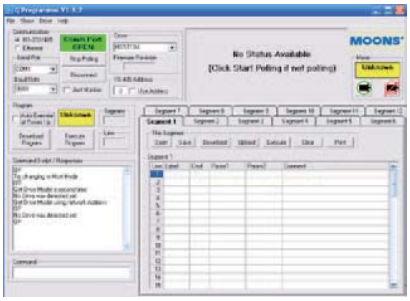
Step-Servo Quick Tuner



Feature

- Friendly Interface
- Easy setup within just three steps
- Drive setup and configuration
- Servo Tuning and Sampling
- Motion testing and monitoring
- Write and save SCL command scripts
- Online help integrated

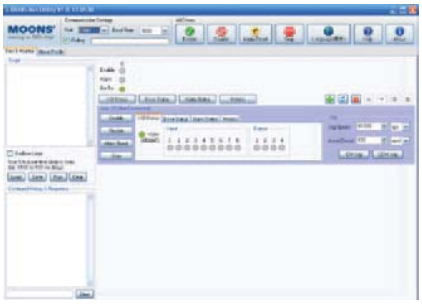
Q Programmer



Feature

- Single-axis motion control
- Stored program execution
- Multi-tasking
- Conditional processing
- Math functions
- Data registers
- Motion Profile simulation
- Online help integrated

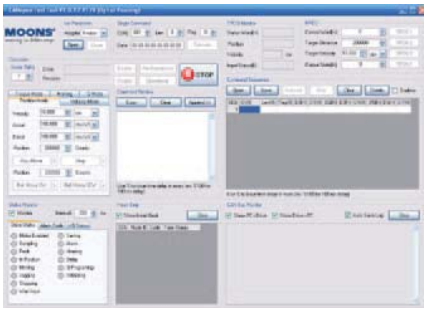
RS485 Bus Utility



Feature

- Stream SCL commands from the command line
- Simple interface with powerful capability
- Easy setup with RS-485 for 32 axis network motion control
- Monitoring Status of I/O, drive, alarm and the other nine most
- useful motion parameters
- Write and save SCL command scripts
- Online help integrated
- Supports all RS-485 drives

CANopen Test Tool



Feature

- Friendly User Interface
- Multiple operation Mode Support
- Multi-Thread, High Performance
- CAN bus monitor and log function
- Kvaser/PEAK adapter support

FREE DOWNLOAD
Our software and user manual can be downloaded from our website:

www.moonsindustries.com

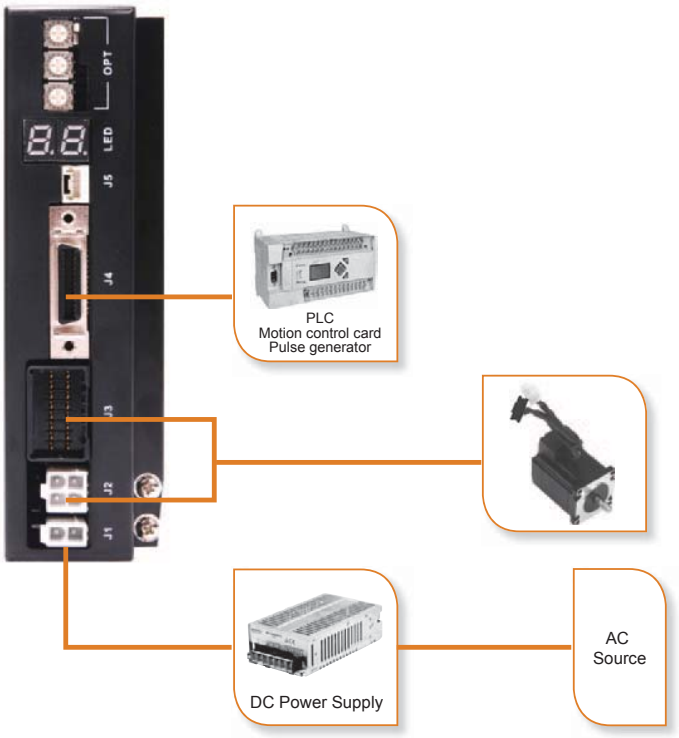
All software applications run on Windows 7, Vista, XP, NT, 2000, 32-bit or 64-bit

◇ -R Switch Setting Pulse Input Type

Controlled via pulse generator.

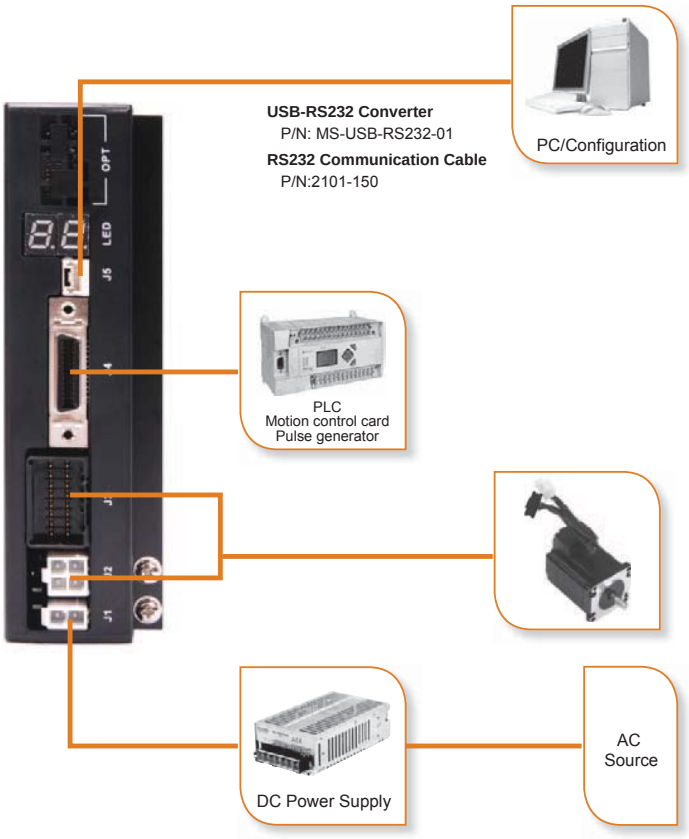
Main Features

- Accepts three types of pulse signal input as Pulse&Direction, CW/CCW and A/B Quadrature
- Encoder signal output, A/B/Z differential
- Configutaion and Tuning via switches



Ordering Information

150W P/N: MF150A24AG-V
320W P/N: MF320A48AG-V



Ordering Information

150W P/N: MF150A24AG-V
320W P/N: MF320A48AG-V

◇ -P Software Setting Pulse Input Type

Controlled via pulse generator.

Main Features

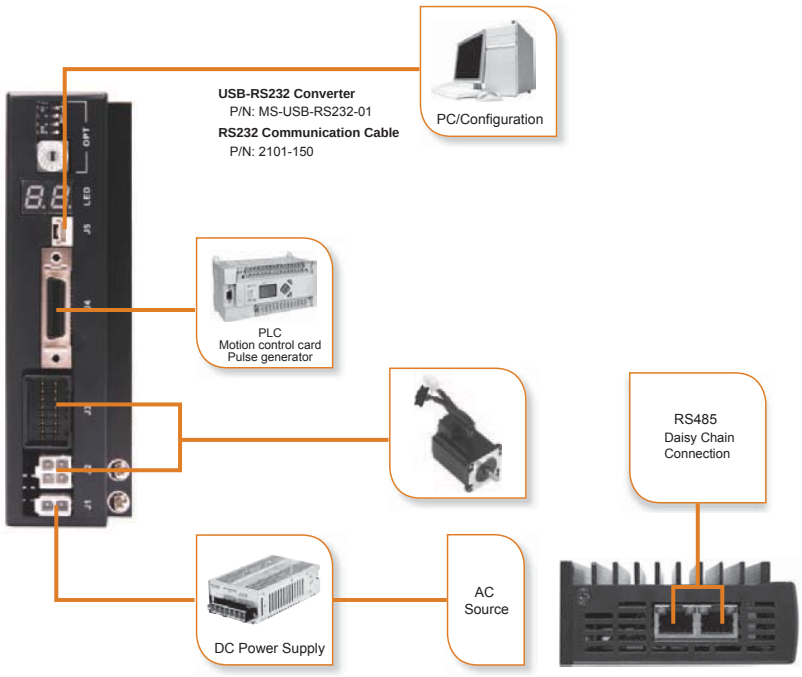
- Accepts three types of pulse signal input as Pulse&Direction, CW/CCW and A/B Quadrature
- Encoder signal output, A/B/Z differential

◇ -S Basic Type with Serial Communication

Controlled via pulse signals, analog signal or MOONS' SCL streaming series commands.

Main Features

- Pulse control
- Analog control
- Host real time control using SCL via RS-232/RS-485
- Up to 32 axes per channel for RS-485
- Support Position Table(up to 63 points)



Ordering Information

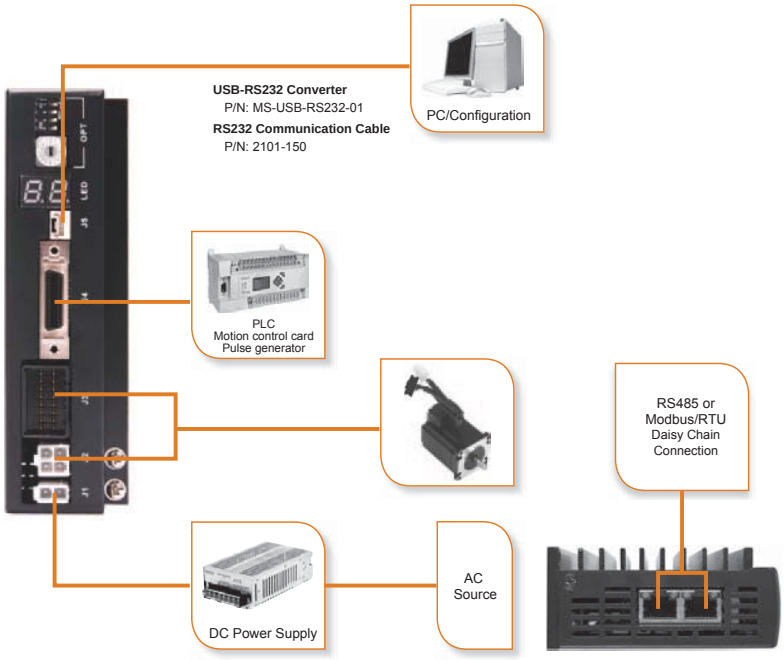
150W P/N: MF150A24AG-V
320W P/N: MF320A48AG-V

◇ -Q Built-in Programmable Motion Controller (Includes Modbus/RTU type)

Run stand-alone with sophisticated and functional programs. Commands for controlling motion, inputs & outputs, drive configuration and status, as well as math operations, register manipulation, and multi-tasking.

Main Features

- Stand-alone operation plus Serial host control
- Math operations
- Register manipulation
- Multi-tasking
- With all features in S type
- **Modbus/RTU** network, up to 32 axes per channel



Ordering Information

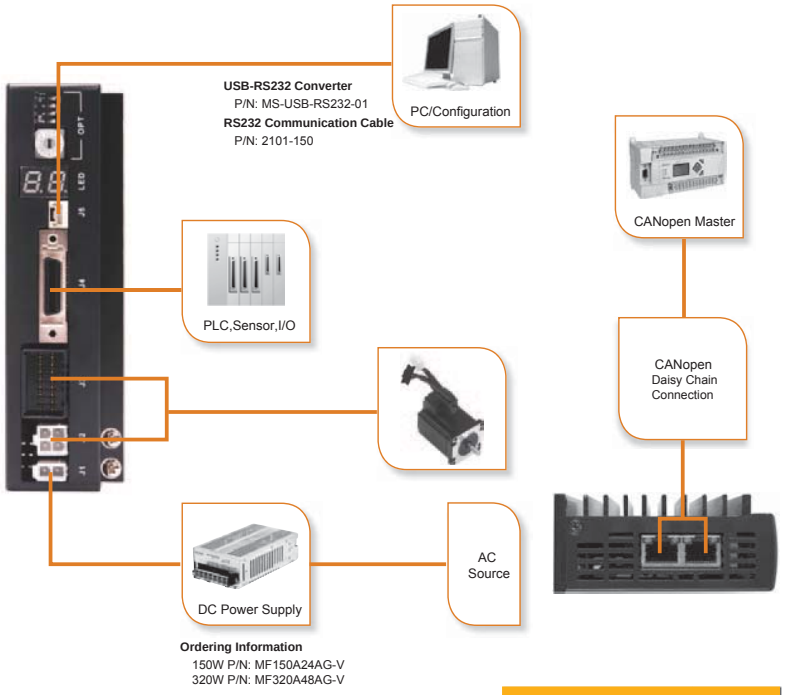
150W P/N: MF150A24AG-V
320W P/N: MF320A48AG-V

◇ -CANopen Type

Operates on a **CANopen** communication network and conforms to CiA301 and CiA402. It supports runing stored Q programs via MOONS'-specific **CANopen** objects.

Main Features

- **CANopen** network
- Up to 127 axes per channel
- Objects for Q programming



Specifications

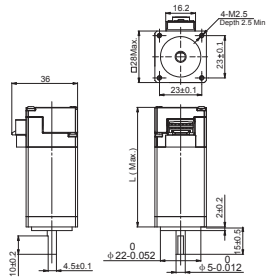
Power Amplifier	
Amplifier Type	Dual H-Bridge, 4 Quadrant
Current Control	4 state PWM at 20 KHz
Output Current	SS03: Continuous Current 3A max, Boost Current 4.5A max (1.5s), current limitation auto set-up by attached motor
	SS05: Continuous Current 5A max, Boost Current 7.5A max (1.5s), current limitation auto set-up by attached motor
	SS10: Continuous Current 10A max, Boost Current 15A max (1.5s), current limitation auto set-up by attached motor
Power Supply	External nominal 24 - 75 volt DC power supply required, Absolute maximum input voltage range 18 - 80 VDC
Protection	Over-voltage, under-voltage, over-temp, motor/winding shorts (phase-to-phase, phase-to-ground)
Controller	
Electronic Gearing	Software selectable from 200 to 51200 steps/rev in increments of 2 steps/rev
Filters	Digital input noise filter, Analog input noise filter, Smoothing filter, PID filter, Notch filter
Non-Volatile Storage	Configurations are saved in FLASH memory on-board the DSP
Modes of Operation	R/P type: Position Mode(Pulse & Direction, CW & CCW Pulse, A/B Quadrature) S type: Position Mode(Pulse & Direction, CW & CCW Pulse, A/B Quadrature); Torque Mode, Velocity Mode, SCL Mode Q type: Position Mode(Pulse & Direction, CW & CCW Pulse, A/B Quadrature); Torque Mode, Velocity Mode, SCL Mode, Q Programming, Modbus/RTU C type: CANopen, CiA301, CiA402, Q Programming
Position Table(S type only)	Built-in Position Table, up to 63 positions
Digital Inputs	R/P type: X1/STEP, X2/DIR, X3/CW Limit, X4/CCW Limit; Optically isolated, differential, 5-24VDC; Minimum pulse width = 250 ns, Maximum pulse frequency = 2 MHz; X5/Enable, X6/Alarm Reset; Optically isolated, single-ended, 5-24VDC S/Q/C type: X1/STEP, X2/DIR, X3/CW Limit, X4/CCW Limit; Optically isolated, differential, 5-24VDC; Minimum pulse width = 250 ns, Maximum pulse frequency = 2 MHz; X5/Enable, X6/Alarm Reset, X7, X8; Optically isolated, single-ended, 5-24VDC
Digital Outputs	R/P type: Y1/Alarm, Y2/In Position; Optically isolated, 30V/100 mA max S/Q/C type: Y1/Alarm, Y2/In Position, Y3, Y4; Optically isolated, 30V/100 mA max
Analog Inputs (S/Q/C type only)	Two analog inputs Each input can accept a signal range of 0 to 5 VDC, ±5 VDC, 0 to 10 VDC or ±10 VDC
Encoder Outputs (R/P type only)	Differential encoder outputs (A±, B±, Z±), 26C31 line driver, 20 mA sink or source max
+5V Output	4.8~5V, 100 mA max
Communication	RS-232, RS-485(optional), Modbus/RTU(optional), CANopen(optional)
Physical	
Ambient Temperature	0 to 40°C (32 to 104°F) when mounted to a suitable heatsink
Ambient Humdity	90% Max., non-condensing
Mass	Approx 0.3 Kg

Dimensions(Unit:mm)

Visit www.moonsindustries.com to get the 3D drawings.

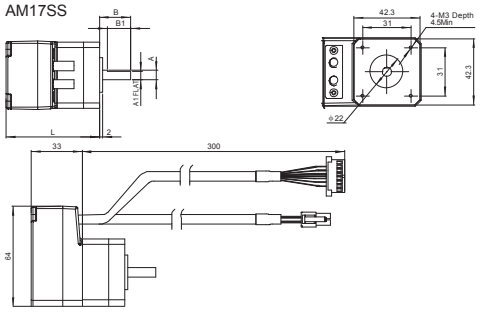
◇ Motor

AM11SS



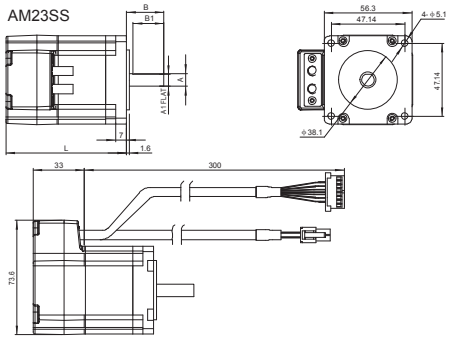
Model	L
AM11SS1DMA	43.8
AM11SS2DMA	52.9
AM11SS3DMA	64.1

AM17SS



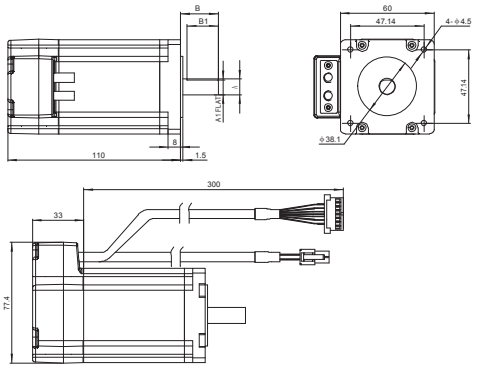
Model	A	A1	B	B1	L
AM17SS1DGA	φ6	5.5	20	15	59.5
AM17SS1DGB	φ5	4.5	24	15	59.5
AM17SS2DGA	φ6	5.5	20	15	65
AM17SS2DGB	φ5	4.5	24	15	65
AM17SS3DGA	φ6	5.5	20	15	73.5
AM17SS3DGB	φ5	4.5	24	15	73.5
AM17SS4DGA	φ6	5.5	20	15	89
AM17SS4DGB	φ5	4.5	24	15	89

AM23SS



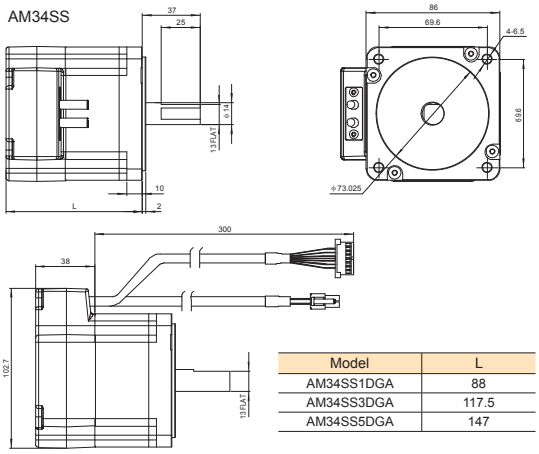
Model	A	A1	B	B1	L
AM23SS2DGA	φ8	7.5	24	20	77.5
AM23SS2DGB	φ6.35	5.85	20	15	77.5
AM23SS3DGA	φ8	7.5	24	20	99.5
AM23SS3DGB	φ6.35	5.85	20	15	99.5

AM24SS



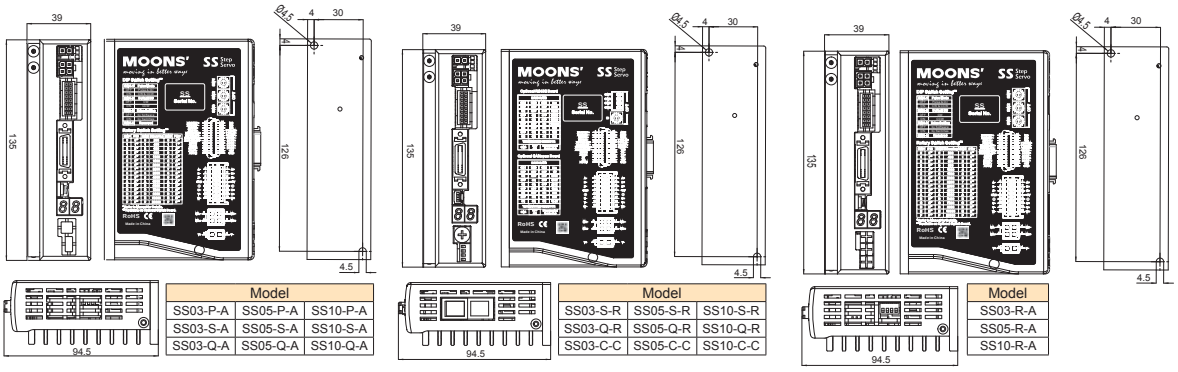
Model	A	A1	B	B1
AM24SS3DGA	φ10	9.5	24	20
AM24SS3DGB	φ8	7.5	20	15

AM34SS



Model	L
AM34SS1DGA	88
AM34SS3DGA	117.5
AM34SS5DGA	147

◇ Drive



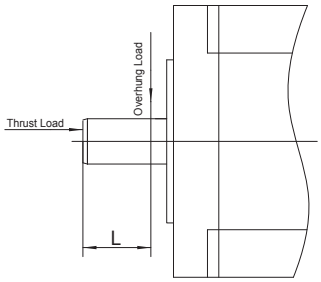
Model		
SS03-P-A	SS05-P-A	SS10-P-A
SS03-S-A	SS05-S-A	SS10-S-A
SS03-Q-A	SS05-Q-A	SS10-Q-A

Model		
SS03-S-R	SS05-S-R	SS10-S-R
SS03-Q-R	SS05-Q-R	SS10-Q-R
SS03-C-C	SS05-C-C	SS10-C-C

Model
SS03-R-A
SS05-R-A
SS10-R-A

Motor Specifications

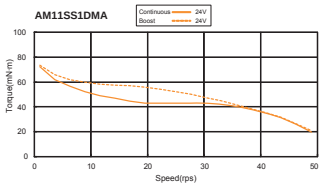
Motor P/N	Drive P/N	Holding Torque	Rotor Inertia	Encoder Resolution	Maximum Speed	Mass	Frame Size	Permissible Overhung Load (N) Distance(L) from Shaft End(mm)					Permissible Thrust Load
								0	5	10	15	20	
		N•m	g•cm^2	counts/rev	RPM	g							
AM11SS1DMA	SS03-■-◇	0.05	9	4096	3600	118	28mm	20	2 5	34	52	-	Less than the motor mass
AM11SS2DMA		0.07	12			168							
AM11SS3DMA		0.09	18			218							
AM17SS1DG □	SS03-■-◇or SS05-■-◇	0.3	38	20000		390	42mm	35	44	58	85	-	
AM17SS2DG □		0.5	57			440							
AM17SS3DG □		0.6	82			520							
AM17SS4DG □		0.75	123			760							
AM23SS2DG □	SS05-■-◇	0.9	260			850	56mm	63	75	95	130	190	
AM23SS3DG □		1.5	460			1250							
AM24SS3DG □	SS10-■-◇	2.5	900			1650	60mm	90	100	130	180	270	
AM34SS1DGA		3.5	915			2000	80mm	260	290	340	390	480	
AM34SS3DGA		6.0	1480			3100							
AM34SS5DGA		8.0	2200			4200							

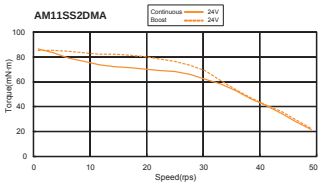


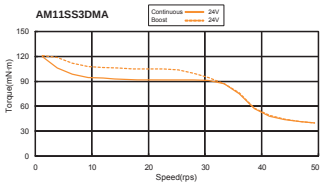
□: A or B, refer to motor part numbering system; ■: R, P, S, Q, or C, refer to driver part numbering system; ◇: A, R or C, refer to driver part numbering system

◇ Torque Curves

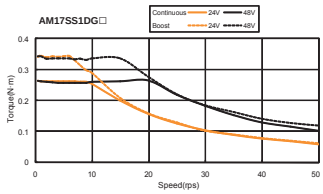
AM11SS Series

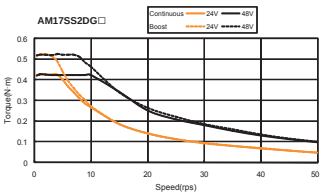


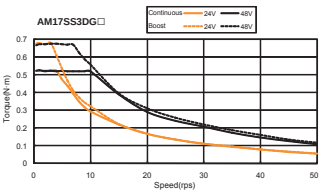


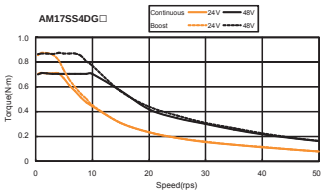


AM17SS Series

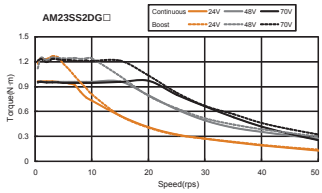


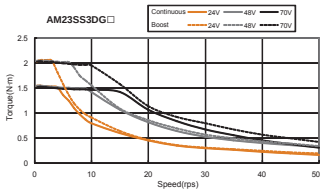






AM23SS Series





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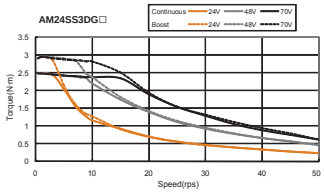
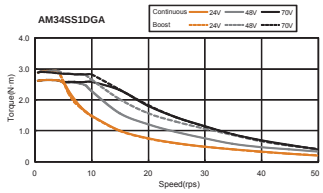
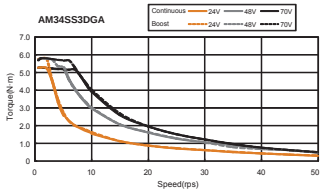
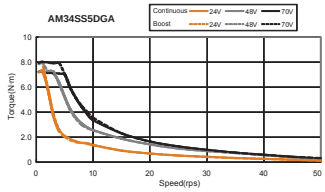


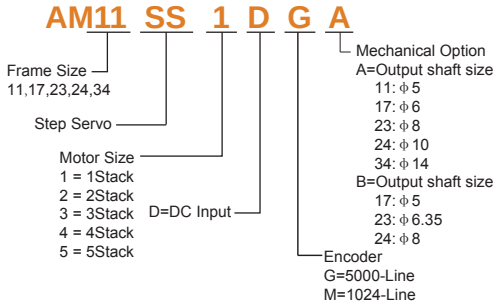
AM34SS Series

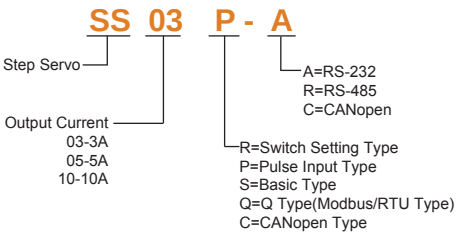






Numbering System





Ordering Information

Control	Drive Type	Motor Type	Torque	Control	Drive Type	Motor Type	Torque
R Type Pulse Input Type Selectable Switch & RS232 Software 6 Digital Inputs 2 Digital Outputs Encoder Output	SS03-R-A	AM11SS1DMA	0.05N·m	P Type Pulse Input Type RS232 Software 6 Digital Inputs 2 Digital Outputs Encoder Output	SS03-P-A	AM11SS1DMA	0.05N·m
		AM11SS2DMA	0.07N·m			AM11SS2DMA	0.07N·m
		AM11SS3DMA	0.09N·m			AM11SS3DMA	0.09N·m
	SS03-R-A / SS05-R-A	AM17SS1DG ☐	0.3N·m		SS03-P-A / SS05-P-A	AM17SS1DG ☐	0.3N·m
		AM17SS2DG ☐	0.5N·m			AM17SS2DG ☐	0.5N·m
		AM17SS3DG ☐	0.6N·m			AM17SS3DG ☐	0.6N·m
		AM17SS4DG ☐	0.75N·m			AM17SS4DG ☐	0.75N·m
	SS05-R-A	AM23SS2DG ☐	0.9N·m		SS05-P-A	AM23SS2DG ☐	0.9N·m
		AM23SS3DG ☐	1.5N·m			AM23SS3DG ☐	1.5N·m
	SS10-R-A	AM24SS3DG ☐	2.5N·m		SS10-P-A	AM24SS3DG ☐	2.5N·m
		AM34SS1DGA	3.5N·m			AM34SS1DGA	3.5N·m
		AM34SS3DGA	6.0N·m			AM34SS3DGA	6.0N·m
		AM34SS5DGA	8.0N·m			AM34SS5DGA	8.0N·m

Control	Drive Type	Motor Type	Torque	Control	Drive Type	Motor Type	Torque
S Type Basic Type RS232 Communication 8 Digital Inputs 4 Digital Outputs 2 Analog Inputs	SS03-S-A	AM11SS1DMA	0.05N·m	S Type Basic Type RS485 Communication 8 Digital Inputs 4 Digital Outputs 2 Analog Inputs	SS03-S-R	AM11SS1DMA	0.05N·m
		AM11SS2DMA	0.07N·m			AM11SS2DMA	0.07N·m
		AM11SS3DMA	0.09N·m			AM11SS3DMA	0.09N·m
	SS03-S-A / SS05-S-A	AM17SS1DG ☐	0.3N·m		SS03-S-R / SS05-S-R	AM17SS1DG ☐	0.3N·m
		AM17SS2DG ☐	0.5N·m			AM17SS2DG ☐	0.5N·m
		AM17SS3DG ☐	0.6N·m			AM17SS3DG ☐	0.6N·m
		AM17SS4DG ☐	0.75N·m			AM17SS4DG ☐	0.75N·m
	SS05-S-A	AM23SS2DG ☐	0.9N·m		SS05-S-R	AM23SS2DG ☐	0.9N·m
		AM23SS3DG ☐	1.5N·m			AM23SS3DG ☐	1.5N·m
	SS10-S-A	AM24SS3DG ☐	2.5N·m		SS10-S-R	AM24SS3DG ☐	2.5N·m
		AM34SS1DGA	3.5N·m			AM34SS1DGA	3.5N·m
		AM34SS3DGA	6.0N·m			AM34SS3DGA	6.0N·m
		AM34SS5DGA	8.0N·m			AM34SS5DGA	8.0N·m

Control	Drive Type	Motor Type	Torque	Control	Drive Type	Motor Type	Torque
Q Type Programm Type RS232 Communication Modbus/RTU 8 Digital Inputs 4 Digital Outputs 2 Analog Inputs	SS03-Q-A	AM11SS1DMA	0.05N·m	Q Type Programm Type RS485 Communication Modbus/RTU 8 Digital Inputs 4 Digital Outputs 2 Analog Inputs	SS03-Q-R	AM11SS1DMA	0.05N·m
		AM11SS2DMA	0.07N·m			AM11SS2DMA	0.07N·m
		AM11SS3DMA	0.09N·m			AM11SS3DMA	0.09N·m
	SS03-Q-A / SS05-Q-A	AM17SS1DG ☐	0.3N·m		SS03-Q-R / SS05-Q-R	AM17SS1DG ☐	0.3N·m
		AM17SS2DG ☐	0.5N·m			AM17SS2DG ☐	0.5N·m
		AM17SS3DG ☐	0.6N·m			AM17SS3DG ☐	0.6N·m
		AM17SS4DG ☐	0.75N·m			AM17SS4DG ☐	0.75N·m
	SS05-Q-A	AM23SS2DG ☐	0.9N·m		SS05-Q-R	AM23SS2DG ☐	0.9N·m
		AM23SS3DG ☐	1.5N·m			AM23SS3DG ☐	1.5N·m
	SS10-Q-A	AM24SS3DG ☐	2.5N·m		SS10-Q-R	AM24SS3DG ☐	2.5N·m
		AM34SS1DGA	3.5N·m			AM34SS1DGA	3.5N·m
		AM34SS3DGA	6.0N·m			AM34SS3DGA	6.0N·m
		AM34SS5DGA	8.0N·m			AM34SS5DGA	8.0N·m

Control	Drive Type	Motor Type	Torque
C Type CANopen 8 Digital Inputs 4 Digital Outputs 2 Analog Inputs	SS03-C-C	AM11SS1DMA	0.05N·m
		AM11SS2DMA	0.07N·m
		AM11SS3DMA	0.09N·m
	SS03-C-C / SS05-C-C	AM17SS1DG ☐	0.3N·m
		AM17SS2DG ☐	0.5N·m
		AM17SS3DG ☐	0.6N·m
		AM17SS4DG ☐	0.75N·m
	SS05-C-C	AM23SS2DG ☐	0.9N·m
		AM23SS3DG ☐	1.5N·m
	SS10-C-C	AM24SS3DG ☐	2.5N·m
		AM34SS1DGA	3.5N·m
		AM34SS3DGA	6.0N·m
		AM34SS5DGA	8.0N·m

☐ : Enter A(Enhanced Shaft) or B(Standard) in the box(☐) within the model name

Standard Accessories

P/N	Catagory	Technical Specification
1103-200	Cable	Power Supply Cable
2101-150	Cable	RS232 Communication Cable

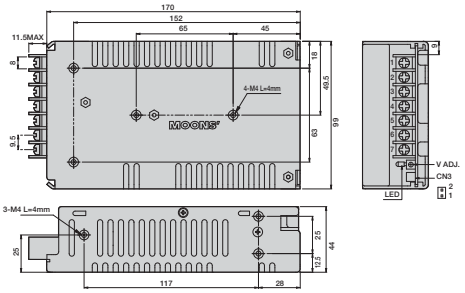
Optional Accessories (Sold separately)

P/N	Catagory	Technical Specification
MF150A24AG-V	Switching Power Supply	150W, 24V
MF320A48AG-V	Switching Power Supply	320W, 48V
2103-□□□	Cable	Motor Extension Cable for AM17/23/24/34SS motor
2109-□□□	Cable	Motor Extension Cable for AM11SS motor
2104-□□□	Cable	Encoder Extension Cable for AM17/23/24/34SS motor
2108-□□□	Cable	Encoder Extension Cable for AM11SS motor

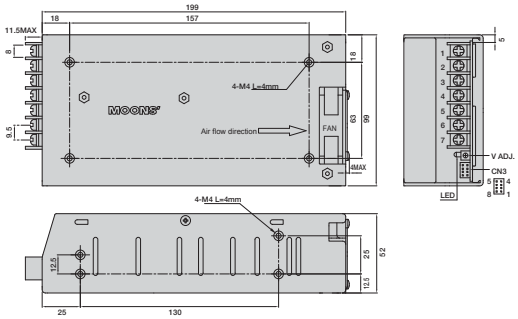
◇ Switching Power Supplies

MOONS' recommend to use following switching power supplies

P/N:MF150A24AG-V 150W,24VDC



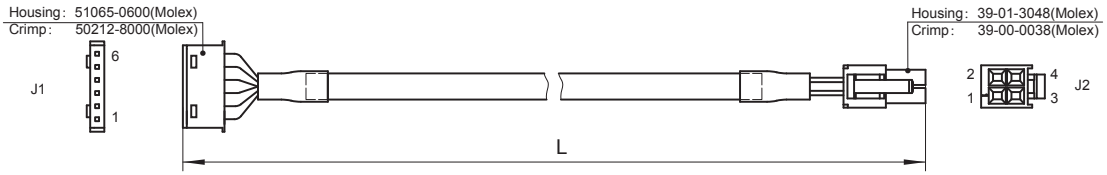
P/N:MF320A48AG-V 320W,48VDC



◇ Motor Extended Cable for AM11SS motor

P/N	Length
2109-100	1M
2109-300	3M
2109-500	5M
2109-1000	10M

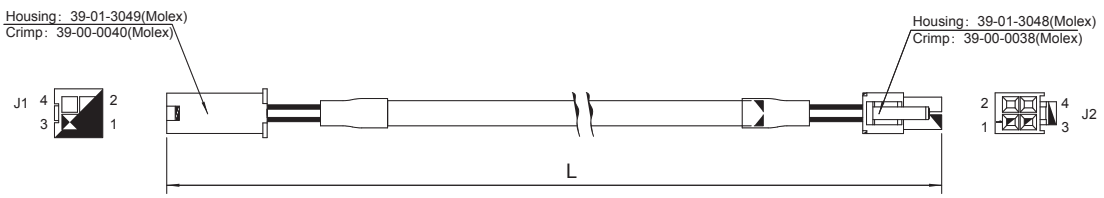
Wiring Diagram		
PIN（J1）	Colour(Signal)	PIN（J2）
1	Blue（B-）	1
3	Red（B+）	2
4	Green（A-）	3
6	Black（A+）	4



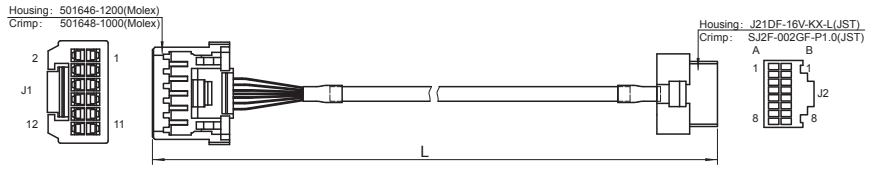
◇ Motor Extended Cable for AM17/23/24/34SS motor

P/N	Length
2103-100	1M
2103-300	3M
2103-500	5M
2103-1000	10M

Wiring Diagram		
PIN（J1）	Colour(Signal)	PIN（J2）
1	Blue（B-）	1
2	Red（B+）	2
3	Green（A-）	3
4	Black（A+）	4



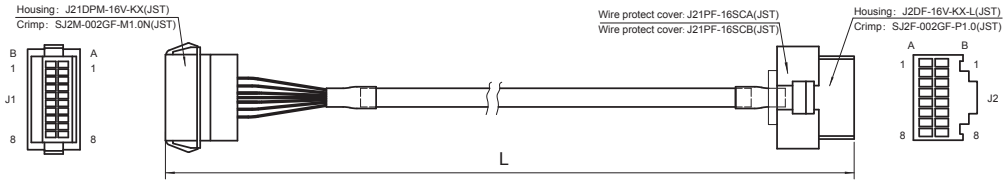
◇ Encoder Extended Cable for AM11SS motor



P/N	Length
2108-100	1M
2108-300	3M
2108-500	5M
2108-1000	10M

Wiring Diagram					
PIN（J1）	Colour(Signal)	PIN（J2）	PIN（J1）	Colour(Signal)	PIN（J2）
10	Blue（A+）	A8		Brown（U+）	A3
9	Blue/Black（A-）	B8		Brown/Black（U-）	B3
8	Green（B+）	A7		Gray（V+）	A2
7	Green/Black（B-）	B7		Gray/Black（V-）	B2
6	Yellow（Z+）	A6	1	White（W+）	A1
5	Yellow/Black（Z-）	B6	2	White/Black（W-）	B1
3	Red（+5V）	A5	12	Shield	B4
4	Black（GND）	B5			

◇ Encoder Extended Cable for AM17/23/24/34SS motor



P/N	Length
2104-100	1M
2104-300	3M
2104-500	5M
2104-1000	10M

Wiring Diagram					
PIN（J1）	Colour(Signal)	PIN（J2）	PIN（J1）	Colour(Signal)	PIN（J2）
A8	Blue（A+）	A8	A3	Brown（U+）	A3
B8	Blue/Black（A-）	B8	B3	Brown/Black（U-）	B3
A7	Green（B+）	A7	A2	Gray（V+）	A2
B7	Green/Black（B-）	B7	B2	Gray/Black（V-）	B2
A6	Yellow（Z+）	A6	A1	White（W+）	A1
B6	Yellow/Black（Z-）	B6	B1	White/Black（W-）	B1
A5	Red（+5V）	A5	B4	Shield	B4
B5	Black（GND）	B5			

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